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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/693,988	10/27/2003	Reshef Tenne	TENNE=3A	5785

1444 7590 12/15/2004

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WASHINGTON, DC 20001-5303

EXAMINER
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LORENZO, JERRY A

ART UNIT	PAPER NUMBER
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1734

DATE MAILED: 12/15/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

10/693,988

Applicant(s)

TENNE ET AL.

Examiner

Jerry A. Lorengo

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final:
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1 and 2 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1 and 2 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☒ Certified copies of the priority documents have been received in Application No. 10/693,988.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date 10/27/03&02/18/04
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_

## **DETAILED ACTION**

(1)

### ***Claim Objections***

Claim 1 is objected to because of the following informalities: it appears to end with a grammatically or syntactically incorrect phrase, i.e., "... said nanotubes.". Appropriate correction is required.

(2)

### ***Claim Rejections - 35 USC § 112***

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claim 1 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

The term "mild" in claim 1 (line 20) is a relative term which renders the claim indefinite. The term "mild" is not defined by the claim, the specification does not provide a standard for ascertaining the requisite degree, and one of ordinary skill in the art would not be reasonably apprised of the scope of the invention. The use of the term "mild" in describing the reducing atmosphere renders the claim indefinite because it is not understood how the term "mild" modifies the characteristics of the reducing atmosphere.

The term "long" in claim 1 (line 23) is a relative term which renders the claim indefinite. The term "long" is not defined by the claim, the specification does not provide a standard for ascertaining the requisite degree, and one of ordinary skill in the art would not be reasonably apprised of the scope of the invention. The use of the term "long" in describing the length of the nanotubes renders the claim indefinite because it is not understood how the term "long" modifies the characteristics of the nanotubes. Claim 2 is likewise rejected due to its dependency upon rejected base claim 1.

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(2)

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 1 and 2 are rejected under 35 U.S.C. 103(a) as being unpatentable over Dai et al.<sup>1</sup> in view of WO 98/23796 to Homyonfer et al.

Regarding applicant claim 1, Dai et al. disclose a method for the preparation of tips for scanning probe microscopy comprising the steps of (Page 147, column 1; and caption to Figure 1):

- (1) Providing a microfabricated silicon tip;
- (2) Providing an adhesive-coated carbon tape;

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- (3) Providing a bundle of nanotubes disposed on a different area of the tape;
  - (4) Transferring a portion of the adhesive disposed on the carbon tape to the tip of the silicon tip;
  - (5) Contacting the adhesively coated silicon tip with the bundle of nanotubes on the tape;
- and
- (6) Pulling the adhesively coated silicon tip away from the bundle of nanotubes on the substrate such that a number of nanotubes remain adhered to the silicon tip with the adhered nanotubes having an average length of between 5 to 20nm.

Dai et al., however, do not specifically disclose, as per applicant claim 1, that the nanotubes comprise transition metal chalcogenide nanotubes obtained through the method set forth in applicant claim 1.

Homyonfer et al., however, also drawn to methods for the synthesis of nanotubes and methods for their use, disclose a method comprising the steps of (page 8, line 18 to page 9, line 7):

- (1) Heating a transition metal material (such as tungsten) in the presence of water vapor in a vacuum apparatus (or via electron beam evaporation) at a pressure of  $10^{-5}$  to  $10^{-6}$  Torr, thereby obtaining nanoparticles of the transition metal oxide having a size from 10 to 50nm (page 6, lines 28-31); and

- (2) Annealing the transition metal oxide nanoparticles in a reducing atmosphere with H<sub>2</sub>S gas at a suitable temperature to form nanotubes of the transition metal chalcogenide (page 5, lines 8-15).

It would have been obvious to one of ordinary skill in the art at the time of invention to utilize the transition metal chalcogenide nanotubes produced by the method of Homyonfer et al. in the method of Dai et al. motivated by the fact that Homyonfer et al. disclose that the transition metal chalcogenide nanotubes formed by their method find specific application in the production of scanning probe microscopy tips which utilize such transition metal chalcogenide materials on their tips (page 5, lines 29-31).

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<sup>1</sup> Hongjie Dai, Jason H. Hafner, Andrew G. Rinzler, Daniel T. Colbert, Richard E. Smalley, **Nanotubes as nanoprobe in scanning probe microscopy**, *Nature* **384**, 147 - 150 (14 Nov 1996).

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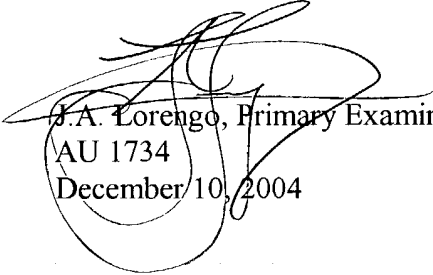
Regarding applicant claim 2, Homyonfer et al. disclose that the transition metal chalcogenide is  $WS_2$  (page 8, line 21).

(3)

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jerry A. Lorengo whose telephone number is (571) 272-1233. The examiner can normally be reached on Monday through Friday, 8:30 A.M. to 5:00 P.M..

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Chris Fiorilla can be reached on (571) 272-1187. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



J.A. Lorengo, Primary Examiner  
AU 1734  
December 10, 2004